

CLAIMS

1. A four-point contact ball bearing comprising:
  - an outer member which has a raceway surface on an inner periphery thereof,
  - an inner member which has a raceway surface on an outer periphery thereof,
  - plural balls rollably disposed in a row between these outer and inner members, and
  - a retainer for disposing these plural balls at equal intervals in a circumferential direction thereof, the balls being in two-point contact with each of both raceway surfaces of the outer member and the inner member, wherein

if  $d$  designates a diameter of the ball,  $D_p$  designates a diameter of a pitch circle of the plural balls disposed between both the raceway surfaces,  $L_1$  designates a distance between centers of adjacent ones of the balls on the pitch circle,  $r$  designates a curvature radius of each of grooves serving as the raceway surfaces circumscribing the ball, and  $\alpha$  designates a contact angle between the ball and each of the raceway surfaces of the outer and inner races,

$d$ ,  $D_p$ ,  $L_1$ ,  $r$ , and  $\alpha$  are set in such a way as to meet the following inequalities, respectively:

$$0.011 \leq d/D_p \leq 0.017,$$

$$1.5 \leq L_1/d \leq 2.1,$$

0.54  $\leq$  r/d  $\leq$  0.59, and  
15°  $\leq$   $\alpha$   $\leq$  25°; and  
an axial gap  $S_A$  between the outer race and the inner race, which are in contact with each other through the ball, is set in such a way as to meet the following inequality:

$$-0.050 \text{ mm} \leq S_A \leq 0 \text{ mm}.$$

2. A four-point contact ball bearing comprising:  
an outer member which has a raceway surface on an inner periphery thereof,  
an inner member which has a raceway surface on an outer periphery thereof,  
plural balls rollably disposed in a row between these outer and inner members, and  
a retainer for disposing these plural balls at equal intervals in a circumferential direction thereof, the balls being in two-point contact with each of both raceway surfaces of the outer member and the inner member, wherein  
each of the balls is formed of high-carbon chrome steel;  
and  
a carbonitrided layer having Vickers hardness  $H_V$  of 740 to 940 is formed on a surface of each of the balls.

3. A four-point contact ball bearing comprising:

an outer member which has a raceway surface on an inner periphery thereof,

an inner member which has a raceway surface on an outer periphery thereof,

plural balls rollably disposed in a row between these outer and inner members, and

a retainer for disposing these plural balls at equal intervals in a circumferential direction thereof, the balls being in two-point contact with each of both raceway surfaces of the outer member and the inner member, wherein

the balls are made of martensitic stainless steel; and

a cabonitrided layer having Vickers hardness  $H_v$  of 1200 to 1500 is formed on a surface of each of the balls.

4. A four-point contact ball bearing comprising:

an outer member which has a raceway surface on an inner periphery thereof,

an inner member which has a raceway surface on an outer periphery thereof,

plural balls rollably disposed in a row between these outer and inner members, and

a retainer for disposing these plural balls at equal intervals in a circumferential direction thereof, the balls being in two-point contact with each of both raceway surfaces

of the outer member and the inner member, wherein  
the balls are made of engineering ceramics; and  
a surface of each of the balls has Vickers hardness Hv  
ranging from 1300 to 2700.